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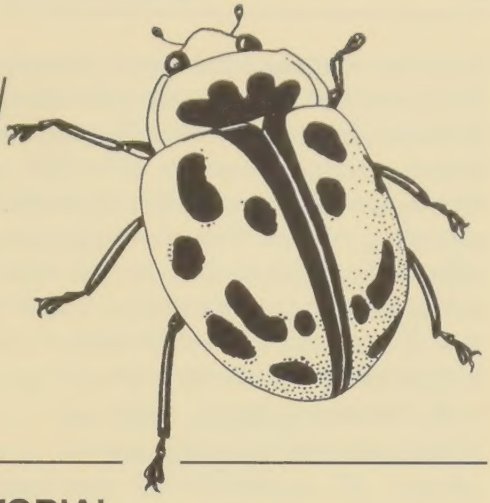

No. 72, October 2013

EDITORIAL

In the last three years, the UK government has issued an unprecedented flow of policy proposals for biological conservation. The policies seem to reflect two underlying central aims. One of these, which seems reasonable in principle, if sometimes worrying in practice, is to rationalise the complex and unwieldy laws and regulations that have accumulated over many decades. The other, which is inherently worrying for many people involved in conservation, is to lift restrictions that were originally intended to protect the environment but that are now perceived to impede economic growth.

The latest move towards rationalisation is concerned with "smart guidance" on compliance with existing UK wildlife laws, rather than with revision of these laws, which is also one of the government's eventual aims. Rationalisation and clarification should seem worthwhile in the eyes of anyone who has grappled with the guidance on laws that control activities such as trade in scheduled invertebrates. Some people would, for example, feel relief if the authorities could give clearer and less onerous guidance on the actions that might be necessary in order to sell lawfully obtained specimens of scheduled species, or even to possess such specimens. On the other hand, the government's attempts to distinguish between the 'least protected' and the 'most protected' species seem almost to encourage the killing of taxa such as wasps and ants of any species.

The UK government's information on biodiversity offsetting looks very positive at first glance, carrying, as it does, the almost unarguable message that wildlife and people can happily co-exist. There is also a claim that offsetting would provide a nett gain, partly by helping to

'join up' habitats that are currently isolated. The details indicate, however, that offsetting would enable developers to exploit the most biologically sensitive sites for commercial gain, provided that they can buy a suitable number of 'units', represented by the creation or restoration of superficially equivalent habitat elsewhere. Although the offsetting 'Green Paper' recognises that certain kinds of habitat are effectively irreplaceable, not all such habitats are listed as such in the accompanying guidance on implementation. For example, ancient wood pasture is not listed as such, even though it provides irreplaceable habitat for some of our rarest saproxylic species.

We should perhaps welcome the government's recognition that certain habitat-types cannot be replaced by trading in 'biodiversity offsets'. If, however, the vast majority of habitats are treated as replaceable, offsetting will probably shift the balance in favour of harmful developments except in the most special circumstances. As argued in the editorials of *ICN* 45 and 66, it is irrational and potentially very harmful to rely on site designation so much that a few 'jewels in the crown' are protected while 'all the rest' is effectively deemed worthless. Since in reality, every site has biodiversity value (or potential value), such a false distinction devalues habitats in the wider landscape, which are essential for dynamically shifting populations of invertebrates.

Perhaps the great political advantage of biodiversity offsetting is that it seems to offer a genuine opportunity to promote conservation throughout the landscape even if, in reality, it allows a sharper distinction to be made between a few irreplaceable 'jewels' and everything else, which will be tradeable. In any case, politicians seem determined to parade offsetting as a symbol of their 'green credentials'.

We shall eventually see how biodiversity offsetting will operate in England and perhaps elsewhere in the UK. In other countries, developers and politicians like it but naturalists and biologists have a very different view. Also, past experience of other regulatory instruments shows that they have sometimes not been applied rigorously enough to protect species or habitats as originally intended. Perhaps when law-makers approve regulations such as the European Habitats Directive, they imagine that the aim is to protect a relatively small number of sites of key importance, while economic activity continues unimpeded everywhere else. Thus, when someone opposes a new development at a site which happens to have been colonised by a protected species, they are unlikely to succeed in their opposition to the development unless the site already has some high-status official designation for protection.

At its best, biodiversity offsetting could enable habitats to be restored or enhanced on a scale sufficient to outweigh the loss of biodiversity in the relatively few instances where the habitats to be lost are broadly replaceable. Perhaps offsetting will also be operated rigorously enough to enable biologically unsound planning proposals to be rejected. It might even facilitate conservation in the wider landscape, as suggested in UK government propaganda. On the other hand, it might be operated in order to minimise conflict with economic activity. If so, it could cast a cloak of false security over very harmful site developments. At its worst, offsetting can be regarded as a "quick fix" that could allow great damage to occur, while enabling politicians to claim that they are presiding over a system that favours sustainable development and good stewardship of natural heritage.

NEWS, VIEWS AND GENERAL INFORMATION

Decline of moths in the UK

Climate change is one of the factors indicated as a cause for the recent decline of moths in the UK. Butterfly Conservation's mammoth report (Fox *et al.*, 2013) shows that two-thirds of common and widespread larger moths have declined in the last 40 years. Their report is beautifully presented and illustrated with many alarming and thought-provoking statistics. The principal author of this publicly available work, Richard Fox, has previously published another important work, which takes a closer look at the causes of moth decline.

Fox's (2013) research suggests that major drivers in their recent decline are "*habitat degradation (particularly because of agricultural intensification and changing silviculture) and climate change*". He does, however, qualify this statement, saying that "*definitive data is hard to isolate*" and his work relies mainly on correlative studies. Fox's paper is comprehensive, with references to many recent studies and considers the potential impact of other factors that might have contributed to moth decline and which, in some cases have also been implicated in the decline of other insects (and indeed other animals). These include "invasions" of non-native species, over-collecting, urbanisation and light pollution.

Fox addresses each factor carefully, citing a range of other studies. For invading species he posits "*Globally, non-native species are*

regarded as a principal driver of biodiversity decline and an ongoing threat to species and habitats". To illustrate this assumption he briefly considers plant species that have invaded semi-natural habitats of the moths *Zygaena loti* and *Z. purpuralis*. He concludes, however, that no such "invading" species have so far been implicated in the decline of any UK moth species, despite the potential for negative impacts. He reaches a similar conclusion with regard to the more contentious subject of over-collecting, stating that "*although over-collecting has often been postulated as a cause of decline or extinction for rare moths and butterflies in Britain, there is little evidence to support the assertion...*", again citing numerous studies.

For moths in particular, light pollution, arising perhaps from increased urbanisation, might intuitively be felt to be a potential contributor to decline. Although there do seem to be measurable impacts on some species and on individuals (see *ICN* 69, p. 13), there have not been any studies at population or community level and we cannot be sure, therefore, how light pollution has affected moth populations.

Factors such as chemical pollution and urbanisation, along with others, such as changes in woodland management, may be contributing to the decline of moths in (as yet largely unquantifiable) ways but, according to Fox (*op. cit.*) and to Butterfly Conservation, the impacts of habitat degradation and climate change are likely to be far more significant.

Fox (*op. cit.*) concludes by highlighting the need for far more research (as ever in conservation science): he points out that only recently have we been able to call on large enough, relatively reliable data sets on species distribution that go beyond a few "charismatic" butterfly or bumblebee species in some developed countries.

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Biodiversity offsetting scheme in England

In its Natural Environment White Paper for England (June 2011), the UK government announced an intention to introduce biodiversity offsetting as a means of mitigating biological loss caused by activities

such as urban or industrial development. Similar schemes have operated for many years elsewhere in the world. In the UK, however, attempts to compensate for development-related habitat loss have been confined to a few sites where particularly vulnerable species were present. Such actions have, for example, involved the translocation of specimens or slices of grassland sward to other locations. There has, however, been no formal process for evaluating nett gains or losses, even in the short term. Also, the general consensus is that most schemes involving such translocation tend to fail.

The proposed scheme, which applies to England only, is said to be different, according to the government's definition, as follows: "*Biodiversity offsets are conservation activities designed to deliver biodiversity benefits in compensation for losses, in a measurable way. Biodiversity offsets are distinguished from other forms of ecological compensation by the requirement for measurable outcomes: the losses resulting from the impact of the development and the gains achieved through an offset are measured in the same way.*"

The scheme is based on the quantification of biodiversity gain in the form of 'units', which prospective site developers can buy from 'offset providers' (e.g. other landowners) or provide from their own resources. The developers will need to make a numerical assessment of 'habitat distinctiveness' and 'habitat condition', as set out in government guidelines. The numerical scores are then combined in a matrix, in order to calculate the notional number of 'biodiversity units' per hectare. The procedure needs to be followed for each habitat-type on the site if more than one is to be affected by the proposed development. Similarly an offset provider must quantify the units to be gained by restoring or re-creating habitat elsewhere. Currently, however, there does not seem to be any restriction on the distance between the two (or more) sites; this is a potentially serious weakness in the scheme.

The evaluation of the units to be lost and purchased is to be overseen by the national conservation agency; i.e. Natural England (NE), but it is not clear whether NE will have the resources necessary for this role. Also, there is reason to doubt whether many local planning authorities have the expertise needed to decide whether they should consent to particular developments on the strength of offsetting provisions.

According to the stated principles of offsetting, site developers are not deemed to be buying biodiversity. Nevertheless, offsetting can be regarded as a business-based system that enables biodiversity or environmental value to be traded like a commodity. The concept of such trading seems questionable, if only because biological values

cannot be quantified as readily as commercial goods. Also, there is a risk (potentially high in many instances) of failure of the supposed biodiversity gain because of eventual changes that adversely affect habitats and species. If so, the supposedly traded value will be lost.

Since the 'tradeable' unit of biodiversity must involve action to add value, there is in principle an opportunity to enhance or create habitats in areas that have been ecologically degraded by intensive land use. If substantial funds become available, it might be possible to create relatively large conservation zones. Also, there could be opportunities to bridge gaps between existing habitats. Gap-filling is an especially attractive prospect where the least mobile invertebrate species are concerned but it should not distract attention from the harm that will be done at the development sites. Those sites might have unique value, perhaps by virtue simply of 'where they are', or perhaps because they provide habitats for invertebrate species that lack the mobility to become established elsewhere, at least by natural dispersal. In some instances, site development can lead to the local, regional or even national extinction of such species.

Offsetting clearly seems to pave the way for developments on sites that would otherwise have been protected by virtue of their biological value. There is, however, reason to hope that irreplaceable habitats will not be threatened in this way. In this context, the Biodiversity Green Paper states as follows: "*Some habitats are impossible to recreate on a meaningful timetable. Ancient woodland and limestone pavement fall into this category. Any development which damages these habitats effectively leads to an irreversible loss*". Accordingly, the accompanying guidance for offset-providers indicates that certain types of habitat (e.g. 'aquifer-fed naturally fluctuating water bodies') might be impossible to re-create but the guidance fails to mention ancient woodland or ancient wood pasture in this context. Instead, anyone who reads the guidance is informed that wood pasture and various kinds of woodland can be re-created with "medium" difficulty or restored with "low" difficulty.

The website of DEFRA (the government department in charge of the scheme) extols the potential benefits of offsetting but fails to include any prominent warning about the drawbacks. Thus, there seems to be a serious bias but this is not immediately apparent to the unwary. The government would do better to emulate organisations such as the Woodland Trust or Royal Society for the Protection of Birds, which warn as follows: "*Offsetting should only ever be a last resort, when all other avenues have been explored to avoid loss or damage*".

Another cause for concern is that some of the enhancements that will be provided by offsetting might otherwise have been funded from other sources (e.g. the Higher Level Stewardship scheme) that could become more severely rationed or even withdrawn when government finds that offsetting is placing developers in the role of paymasters for habitat enhancement projects.

Perhaps the main reason to worry about offsetting is that it seems to form part of the UK government's policy to remove restrictions on site development except where high-status formal protection is already in place. According to this principle, many sites are already 'up for grabs'. The proposed scheme would apparently enable the development of yet more sites that would otherwise have been protected to some extent. In any case, developers could use offsetting as an affordable first resort, rather than attempting to provide some degree of protection for biodiversity on their own sites, as they might previously have done in order to obtain planning permission. For such reasons, offsetting has been dubbed a "licence to trash" by various environmental campaigners, including Friends of the Earth.

Although there is good reason to worry about offsetting, it should at least provide a framework in which its success or failure can be evaluated, perhaps to the extent of exposing false hopes or false claims where these exist. Invertebrate biologists and conservationists should therefore be prepared to provide authoritative opinions on the merits and demerits of particular offsetting schemes. Also, there could be opportunities to undertake research on the long-term success (or otherwise) of such schemes and thus to help inform future policy.

In April 2012, two-year pilot projects for biodiversity offsetting were set up in six areas of England: Devon, Doncaster, Essex, Greater Norwich, Nottinghamshire and Warwickshire (including Coventry and Solihull). Then, in September 2013, a plan to adopt offsetting in the whole of England was put forward for public consultation. By the time that this issue of *ICN* has been circulated, the consultation might have ended, since it is due to do so on 7th November. The AES Conservation Committee is, however, intending to have made a submission before that deadline.

Rationalisation of guidance on compliance with UK wildlife laws

As mentioned in our current editorial, it is helpful, in principle, to simplify guidance that has become excessively voluminous and complex over many decades of wildlife legislation. The manner in

which the UK government is attempting to simplify some of this guidance has, however, given some cause for concern. Stephen Miles has looked in detail at the draft "Species Compliance Tool" (DEFRA, 2013), in which large taxonomic groups, such as wasps, ants and slugs, are described under the heading "*You can kill.....*". Clearly the intention is to make things easier, by informing readers that there is no specific UK law against killing any species that belong to these taxa. Unfortunately, however, the information is not accompanied by any statement that many of these are vulnerable and, in some instances, are listed for some form of protection or species-recovery, particularly under the UK Biodiversity Action Plan.

It is perhaps paradoxical that we should have reason, on the one hand, to fear inappropriate species-protection legislation (as has been enacted in many parts of the world) while, on the other hand, the mass slaughter of non-protected species is depicted as being 'all right'.

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SITES AND SPECIES OF INTEREST

Ghost crab survey in Cyprus

The 2013 edition of *Sanctuary* magazine, published by the UK Ministry of Defence, includes a report on the Tufted Ghost Crab *Ocypode cursor* on the east coast of the Akrotiri Peninsula of southern Cyprus, where it is protected under the Berne Convention. Elsewhere, it is found on other eastern Mediterranean coasts and on tropical eastern Atlantic coasts as far south as Namibia but not in the western Mediterranean. It is a semi-terrestrial air-breathing species, inhabiting burrows on sandy coastal beaches and emerging to prey and scavenge for food, mostly at night. As shown by splendid photographs in *Sanctuary* magazine, it is a remarkable-looking animal, reaching up to 60 mm in carapace width and with stalked eyes that provide it with 360-degree vision.

In an undergraduate project based at Northumbria University, BSc student Nicole Mavrovounioti emulated earlier studies (Strachan *et al.*) of the distribution of the crab along the shoreline. She found that the

burrows of the crab in the Sovereign Base Area of Akrotiri were located mostly in a 10 metre-wide belt along the shoreline, with the greatest concentration at 6 metres and with the larger individuals preferring the landward side of the belt. A similar pattern is known to occur on other Mediterranean coasts, where tides are very small. Thus, in the earlier study, Strachan *et al.* (*op. cit.*) found a broadly similar pattern on beaches near Kyrenia in the Turkish sector of northern Cyprus but with certain differences in distance from the shore. Essentially, they found that the zone suitable for burrowing was determined by the depth of the water table beneath the surface. This is of key importance, since the crab needs to be able to take up water from the damp sand at the base of the burrow.

As in the earlier study, Nicole Mavrovounioti measured the temperature range and moisture content on the sand surface and at the depth of the burrows, in order to characterise the conditions that the crabs require for protection from extreme conditions. She found that the sand-surface temperature reached over 46 C in summer. On the beaches previously studied by Strachan *et al.* near Kyrenia, the mean surface temperature in July was over 53°C.

Having established the conditions required by *O. cursor*, Nicole assessed effects of human disturbance by estimating the density of burrows in a public area of beach (Lady's Mile) and a nearby fenced and undisturbed area controlled by the Royal Air Force. She found significantly more burrows in the fenced area. On this basis, there is a strongly suggestion in *Sanctuary* magazine that populations of the crab would benefit if human disturbance could be minimised. This view seems, however, to be at variance with the earlier findings of Strachan *et al.* (*op. cit.*) in northern Cyprus. Their study areas, at Alagadi beach near Kyrenia, were used for bathing and picnicking at intensities ranging from light to heavy. Unlike Nicole Mavrovounioti, they found significantly more burrows in heavily frequented areas.

It is not clear why the two studies seem contradictory with regard to the effects of public access on crab populations but it is interesting to note that vehicles are banned from the Alagadi beach areas and that human access is banned at night in order to protect nesting females of the Green turtle *Chelonia mydas* and the Loggerhead turtle *Caretta caretta*. The latter restriction probably also protects the crabs while they are foraging or maintaining their burrows. Also, Strachan *et al.* (*op. cit.*) observed that the crabs at Alagadi often feed on the remains of picnics. Perhaps, therefore, the potentially adverse effects of disturbance were offset by an increased food supply. In any case, a

comparison between the two studies cannot be exactly like-for-like, since the earlier study did not include a completely undisturbed area. There is apparently a need either for more research or for more detailed analysis of the data in order to inform future decisions on management.

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Renewable energy project threatens a protected insect species

As observed in the editorial of *ICN* 70, 'green technology' can have drawbacks that were rarely considered in the days when it was a struggle to get any form of sustainable technology on to the political agenda. One example of an apparent drawback is the mass impaction of airborne invertebrates on the blades of wind turbines (see *ICN* 70). There is now one particular instance where a threat is feared not from a wind farm in itself but from the proposed landfall of a wind farm cabling system. This is the Walney Extension Offshore Wind farm at Sunderland Point on the Lancashire coast, which is being constructed by DONG Energy.

The intended cable landfall site supports a colony of the Belted Beauty moth *Lycia zonaria britannica* (see, e.g., Fry, R.G., 2013; Kimber, I., 2013), a species that has been in serious decline and that is thought now to occur only at one other site in England. Indeed, recent surveys indicate that it might have died out at the other English site (Butterfly Conservation, 2012). The moth, which is a UK Biodiversity Action Plan Priority Species, used to occur at several other sites on the Lancashire coast and around the Wirrall Peninsula. It is rare also in other parts of Great Britain, now occurring precariously at one site in Wales and with its main stronghold in the Hebrides, in some parts of which the subspecies *atlantica* predominates (Wenman, 2012). Wenman (*op. cit.*) mentions that, in France, *L. zonaria* is confined to inland sites.

The currently available information does not include any detail about the extent of the threat that cable-laying poses to *L. zonaria* at the site concerned but activities such as trenching would clearly destroy and damage areas of vegetation, which includes the locally preferred foodplant, Autumn hawkbit *Leontodon autumnalis*. DONG Energy (2012; 2013) claims to be fully aware of the need to protect the

saltmarsh habitat and the Belted beauty in particular. Since the ground surface would be reinstated after cable laying, DONG Energy (2012) argued that the loss and disruption of habitat would be temporary. Also, DONG proposed to reduce the trench width by half to 20 metres and to shorten the route across the saltmarsh, reducing the trenched area to 6,112 square metres, which DONG estimated to occupy 0.47% of the area of the saltmarsh at this site.

Following a second round of consultation, DONG Energy (2013) has more recently proposed to use only trenchless technology, Horizontal Directional Drilling (HDD), in order to avoid destroying and disrupting the habitat. Tunnels would be drilled within a working corridor, 88 m wide at the landward edge and 262 m wide at the seaward edge. The corridor is wider than would have been used in the original proposal for trenching but DONG argues that this is acceptable because the habitat would be left intact at the surface.

In principle, HDD is a less damaging option but it could presumably still affect the habitat. In August 2013, Steve Palmer of the Lancashire Branch of Butterfly Conservation submitted an objection to the Planning Inspectorate, arguing that it was not known whether the site would be suitable for HDD or whether the cables will be at a suitable depth to avoid any impact on the saltmarsh structure, hydrology, deposition and the Belted Beauty colony. He pointed out that no alternative routes were currently being considered by DONG Energy and that, if HDD were to prove unsuitable or to fail, the more harmful method of trenching would then become the only option. Meanwhile, John Millar, the AES Habitat Conservation Officer, has relayed information that DONG Energy was due to re-assess the site for suitability in mid-September, with results expected in October.

According to the Planning Inspectorate, which has been reviewing the revised proposals, following the due process of community consultation in 2012, a preliminary meeting is due to have taken place in public on 12th November 2013, in order to discuss procedural matters only. There is then due to be a procedural decision, in order to set the timetable for the examination, including deadlines for receipt of detailed written representations and for comments on others' representations. Anyone interested in making further representations should be able to find information at: http://infrastructure.planningportal.gov.uk/Walney

Also there is a petition to try to prevent the saltmarsh being affected. This can be signed at: http://you.38degrees.org.uk/petitions/save-the-belted-beauty-in-lancashire-1

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RESEARCH NOTES

Fungicides implicated in bee decline

As mentioned in *ICN* 64 and 69, there is evidence that bees can be harmed by interactions between factors that might be of little significance singly. The evidence comes mainly from research on the so-called colony collapse disorder (CCD) of honeybees, which is having serious economic consequences in various countries, but there is reason to suspect that bumblebees and other solitary bees can be similarly harmed.

The *ICN* 64 article cited the finding that honeybees exposed to a neonicotinoid (Alaux *et al.*, 2010) showed an increase in susceptibility to the microsporidian parasite *Nosema* spp., which is thought to play a role in CCD. This finding is relevant to the current debate about the merits of banning neonicotinoids, since it indicates that these chemicals can cause harm even at concentrations where they appear to be well tolerated according to conventional tests. Other non-lethal effects include disturbances of behaviour, for example in foraging for food.

It is perhaps not surprising that an insecticide can render bees more susceptible to a parasite. More surprisingly, a similar finding involving fungicides has recently been reported by research workers in the eastern USA, based at the University of Maryland and the US Department of Agriculture (Pettis *et al.*, 2013). They collected pollen from hives that had been placed among seven different types of crop:

almond, apple, blueberry, cranberry, cucumber, pumpkin and watermelon. They found that the pollen had been foraged mainly from a wide range of wildflowers and 'weeds', rather than from the crop species, except in the case of almond and apple. This finding is said to reflect a tendency for *Apis mellifera*, a honeybee of European origin, to avoid collecting pollen from crops that are native to North America.

Insecticide and fungicide residues were found in all the pollen sources, most notably from the apple orchards, which yielded 15 different pesticides, of a grand total of 35. The pollen from these orchards was also the only category that contained any neonicotinoid residues but there were two other insecticides, esfenvalerate and phosmet, which occurred in some of the samples at concentrations more than high enough to kill half the bee population in a standard test. The residues of fungicides were, however, generally greater than those of the insecticides. Some of the samples also contained herbicides.

Pollen collected from the various crop sites was fed, mixed with sucrose syrup, to healthy honeybees. Pesticide-free pollen and a pollen substitute were fed to other healthy bees used as "controls". The bees were then fed with spores of the parasite *Nosema ceranae* in order to test their susceptibility to infection. The resulting incidence of *Nosema* infection was found to be related to the range of pesticide residues in the various pollen sources. In particular, the fungicides chlorothalonil and pyraclostrobin were strongly associated with an increased infection rate. A similar effect was found with the acaricides amitraz and fluvalinate, which beekeepers use to control the *Varroa* mite.

Commenting on the significance of the above findings, the senior author, Dennis vanEngelsdorp, has pointed out that fungicides, unlike insecticides, are not generally supplied with a warning to avoid applying them when bees are likely to be in the vicinity. He also comments that the problem of bee decline will probably not be solved by banning only one class of pesticides, such as the neonicotinoids.

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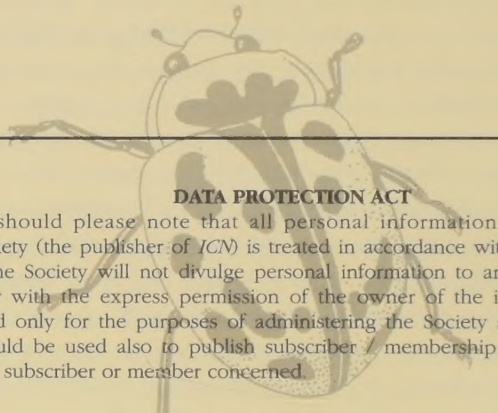

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